

PATENT
EXPEDITED PROCEDURE
UNDER 37 CFR 1.116
GROUP 2853

application. Applicants submit that the original indication of allowance of claims 15, 17 and 19-21 was correct, and reconsideration is requested. Claims 1, 5 and 8 are amended hereby.

Responsive to the rejection of claim 5 under 35 U.S.C. § 112, second paragraph, Applicants respectfully submit that the phrase "at least one via" indicates that there may either be one, single via or a plurality of vias within the scope of the claim. Since the Examiner indicates in the Final Office Action dated November 1, 2001 that she does not understand, Applicants have amended claim 5 in order to remove the problematic language so as to expedite prosecution of this application. Applicants submit that claim 5 is now in allowable form.

Responsive to the rejection of claims 1-5, 9-12, 15 and 19-20 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,033,581 (Kobayashi), Applicants have further amended claim 1 in order to clarify its meaning, respectfully traverse the rejection as it applies to claims 9-12, 15 and 19-20, submit that claims 1-5 are now in condition for allowance, and submit that claims 9-12, 15 and 19-20 are in condition for allowance in their present form.

Kobayashi discloses a silicon substrate 1 (Fig. 3) on which ink discharge pressure elements 5, ink flow paths and discharge openings 4 have been formed (column 3, lines 24-26). Thermal oxidized film 10 (Fig. 7) is processed by photolithography to pattern film 10 by use of a photomask 12 (Fig. 9) having a pattern corresponding to ink feed openings 2 and grooves 3 that are formed around openings 2 and that are intended to prevent the adhesive from flowing (column 3, line 63 through column 4, line 1). A support 6 (Fig. 4) is made of aluminum. Ink feeding holes 8 and protrusions 7 surrounding them, which respectively face openings 2 and grooves 3, are formed by mechanical processing. An adhesive 9 (Fig. 6) is coated on the outskirts of protrusions

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7, and thereafter the silicon substrate 1 on which the anisotropic etching has been completed is put together and bonded (column 5, lines 38-46).

In contrast, claim 1, as amended, recites in part:

a heater chip including a backside with at least one cavity;

a substrate associated with said backside of said heater chip, said substrate having a substantially flat surface opposing said at least one cavity; and

adhesive at least partially disposed within said at least one cavity, said adhesive adhering said backside of said heater chip to said substantially flat surface of said substrate.

(Emphasis added). Applicants submit that such structure is neither taught, disclosed nor suggested by Kobayashi and includes distinct advantages thereover.

Support 6 of Kobayashi does not have a substantially flat surface to which heater chip 1 is adhered and which opposes groove 3. Rather, the surface of support 6 to which heater chip 1 is adhered has protrusions 7 which oppose groove 3. Thus, Kobayashi does not disclose or suggest a heater chip including a backside with at least one cavity, a substrate associated with the backside of the heater chip, the substrate having a substantially flat surface opposing the at least one cavity, and adhesive at least partially disposed within the at least one cavity, with the adhesive adhering the backside of the heater chip to the substantially flat surface of the substrate, as recited by amended claim 1.

The present invention, as recited by claim 1, includes distinct advantages over Kobayashi. A flat substrate is easier to manufacture than one having protrusions. Also, without protrusions on the substrate opposing the cavity, more of the adhesive is contained within the cavity on the backside of the heater chip, thereby increasing the accuracy and precision of the bond line. A

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precise bond line is especially important for applications that require multiple ink vias. Since each of the vias may carry a different color ink, sealing between the ink vias is crucial to prevent cross contamination between different colored inks (page 5, lines 3-6 of the present specification).

For all of the foregoing reasons, Applicants submit that claim 1, and claims 2-5 depending therefrom, are in condition for allowance, which is hereby respectfully requested.

Claim 9, as amended, recites in part "a heater chip including a backside having at least one cavity; and adhesive substantially entirely disposed within said at least one cavity, said adhesive configured for adhering said backside of said heater chip to a substrate." (Emphasis added). Applicants submit that such structure is neither taught, disclosed nor suggested by Kobayashi and includes distinct advantages thereover.

As the Examiner states with regard to claim 8, "prior art has not been found to anticipate the adhesive is substantially entirely disposed within at least one cavity." Fig. 6 of Kobayashi shows that a great majority of the adhesive is not disposed in grooves 3. Rather, it is clear that greater than 80% of the adhesive is between the flat lower surface of heater chip 1 and the flat upper surface of support 6, with less than 20% of the adhesive being in grooves 3. Thus, Kobayashi does not disclose or suggest a heater chip including a backside having at least one cavity; and adhesive substantially entirely disposed within the at least one cavity, with the adhesive adhering the backside of the heater chip to a substrate, as recited by claim 9.

The present invention, as recited by claim 9, includes distinct advantages over Kobayashi. By the adhesive being substantially entirely disposed within the at least one cavity, the accuracy

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and precision of the bond line is improved, with all of the associated advantages discussed above with regard to claim 1.

For all of the foregoing reasons, Applicants submit that claim 9, and claims 10-12 depending therefrom, are in condition for allowance, which is hereby respectfully requested.

Moreover, claim 9 recites subject matter substantially similar to the subject matter of claim 8, which the Examiner indicated to be allowable. Thus, Applicants submit that claim 9, and claims 10-12 depending therefrom, are also in condition for allowance, which is hereby respectfully requested.

Claim 15 recites in part "micromachining at least one cavity in a backside of a heater chip; and adhering said backside of said heater chip to a substrate such that adhesive is at least partially disposed within said at least one cavity." (Emphasis added). Applicants submit that such limitations are neither taught, disclosed nor suggested by Kobayashi and includes distinct advantages thereover.

Grooves 3 of Kobayashi are not formed by micromachining. Rather, Kobayashi only discloses that grooves 3 are formed by anisotropic etching. Thus, Kobayashi does not disclose or suggest micromachining at least one cavity in a backside of a heater chip; and adhering the backside of the heater chip to a substrate such that adhesive is at least partially disposed within said at least one cavity, as recited by claim 15.

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rejection

For all of the foregoing reasons, Applicants submit that claim 15, and claims 19-20 depending therefrom, are in condition for allowance, which is hereby respectfully requested.

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Claims 6-7, 13-14 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi in view of U.S. Patent No. 5,751,324 (Brandon, et al.). However, claims 6-7 depend from claim 1, which is in condition for allowance for the reasons given above; claims 13-14 depend from claim 9, which is in condition for allowance for the reasons given above; and claim 21 depends from claim 15, which is in condition for allowance for the reasons given above. Accordingly, claims 6-7, 13-14 and 21 are also in condition for allowance, which is hereby respectfully requested.

Claim 17 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi in view of U.S. Patent No. 5,821,972 (Mey, et al.). However, claim 17 depends from claim 15, which is in condition for allowance for the reasons given above. Accordingly, claim 17 is also in condition for allowance, which is hereby respectfully requested.

The Examiner indicated that claim 8 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims, for which courtesy the Examiner is thanked. Applicants have rewritten claim 8 in independent form to include the subject matter of claim 1 and submit that claim 8 is now in condition for allowance.

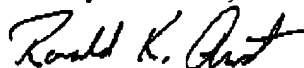
For the foregoing reasons, Applicants submit that the pending claims are definite and do particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Moreover, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance of the claims.

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In the event Applicants have overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefor and authorize that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (317) 894-0801.

Respectfully submitted,



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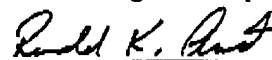
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Name of Registered Representative



Signature

December 31, 2001

Date

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Title: HEATER CHIP FOR AN INKJET PRINTHEAD

Application Serial No.: 09/625,345

Group 2853

Examiner: L. TRAN

ATTACHMENT A:
MARKED-UP COPY SHOWING AMENDMENTS

IN THE CLAIMS

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1. (Twice Amended) An ink jet printhead assembly, comprising:
- a heater chip including a backside with at least one cavity;
- a substrate associated with said backside of said heater chip, said substrate having a substantially flat surface opposing said at least one cavity; and
- 5 adhesive at least partially disposed within said at least one cavity, said adhesive adhering said backside of said heater chip to said substantially flat surface of said substrate.

5. (Amended) The printhead assembly of claim [4] 2, wherein said [at least one via comprises] heater chip includes a plurality of ink vias, said adhesive being configured for preventing fluid communication between said plurality of ink vias in an area defined between said heater chip and said substrate.

8. (Amended) [The printhead assembly of claim 1, wherein said] An ink jet printhead assembly, comprising:

- a heater chip including a backside with at least one cavity;
- a substrate associated with said backside of said heater chip, said substrate having a
- 5 substantially flat surface; and

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adhesive [is] substantially entirely disposed within said at least one cavity, said adhesive
adhering said backside of said heater chip to said substantially flat surface of said substrate.